The opinion in support of the decision being entered today was **not** written for publication and is **not** binding precedent of the Board.

Paper No. 28

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte ANDREW HACKETT, MICHAEL KNEE, MICHEL KERDRANVAT, and NADINE BOLENDER

Appeal No. 1999-2012
Application No. 08/801,610

ON BRIEF

Before HAIRSTON, BARRETT, and LALL, Administrative Patent Judges.

LALL, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the Examiner's final rejection[1] of claims 2, 5, 6, 9, 11 and 13.

The disclosed invention is directed to a method and apparatus for determining motion vectors for respective pixels

[1] Appellants have withdrawn claims 3, 7 and 8 from appeal, see brief at page 2.

in video signal images, wherein a motion vector indicates the relative displacement of an object represented by a pixel from one video signal image (frame) to the next video signal image (frame). This is accomplished by first determining block motion vectors for blocks of pixels by any of known methods and then generating pixel motion vectors using combinations of nearest associated block motion vectors.

A further understanding of the invention can be achieved by the following claim.

13. A method for motion estimation using block matching, wherein motion vectors related to blocks of pixels are calculated, the blocks having a predetermined size, and wherein from the motion vectors for adjacent blocks a single motion vector is calculated, comprising the following steps:

dividing a picture into a such a multiplicity of blocks that at least one block is surrounded at each side by adjacent blocks;

performing for the blocks a block matching in order to determine individual block motion vectors, each corresponding to a particular block of pixels;

calculating for each pixel of a current block an individual pixel motion vector using in each case for a current pixel the block motion vector for the current block and the block motion vectors for the three adjacent blocks, defining four block motion vectors, which are nearest to that portion of pixels of the current block to which the current pixel belongs, wherein said individual pixel motion vector can be different from said block motion vector associated with the current block, and wherein each pixel in said current block can have a

different pixel motion vector than another said pixel in the current block.

The Examiner relies on the following references:

Gillard	4,864,394	Sep. 5, 1989
Keating et al. (Keating)	5,162,907	Nov. 10, 1992
Takahashi	5,347,309	Sep. 13, 1994
	(filing date Apr. 21, 1992)	

Claims 2 and 13 stand rejected under 35 U.S.C. § 102 as being anticipated by Gillard.

Claims 5, 6, 9 and 11 stand rejected under 35 U.S.C. § 103 as being unpatentable over Gillard in view of Keating and Takahashi.

Appellants do not appeal the rejection based on 35 U.S.C. § 112, second paragraph, see brief at page 2 and Examiner's answer at page 2. Therefore, this ground of rejection is not considered in this decision.

Rather than repeat the arguments of Appellants and the Examiner, we make reference to the briefs[2] and the answer for their respective details thereof.

[2] A reply brief was filed as Paper No. 25. The Examiner noted the entry of the reply brief without any further response. See Paper No. 26.

OPINION

We have considered the rejections advanced by the Examiner and the supporting arguments. We have, likewise, reviewed the Appellants' arguments set forth in the briefs.

We reverse.

We consider the two grounds of rejections below.

Rejection under 35 U.S.C. § 102

The Examiner rejects claims 2 and 13 at pages 5 and 6 of the Examiner's answer under this ground of rejection. The Examiner asserts that Gillard anticipates the recited limitations of this claim, id.

Appellants argue, brief at page 6, that "[t]he reference [Gillard] clearly does not show or discuss, 'using ... the block motion vector for the current block and the block motion vectors for the three adjacent blocks ... which are nearest to that portion of pixels of the current block to which the current pixel belongs, ..' as claimed ...." We find that Gillard discloses, column 15, lines 43-50, "[c]onsequently it is necessary to provide a choice of motion vectors for each block such that every pixel within that block will have a fair chance of its motion being accurately estimated. In the

present case four motion vectors are selected from seven local motion vectors. These four motion vectors are then passed to a second processor, that is, vector selector 41, which selects one from four."

We are not persuaded by Examiner's contention, answer at pages 9-10, that "though Gillard shows a motion estimation system that involves applying ... a motion estimation process wherein a choice of four from seven motion vectors, the seven motion vectors being one of that particular block and the six for the six nearest blocks respectively as currently pointed out by the appellants, it nevertheless meets the limitation of calculating for each pixel of a current block an individual pixel motion vector using in each case for a current pixel the block motion vector for the current block motion vectors for the three adjacent blocks, defining four block motion vectors as claimed ...."

In our view, the Examiner has merely recited the claim language without showing how Gillard achieves the claimed step of "calculating for each pixel of a current block an individual pixel motion vector using ... the block motion vector for the current block and the block motion vectors for the three

adjacent blocks, defining four block motion vectors, which are nearest to that portion of pixels of the current block to which the current pixel belongs."

The Examiner has not pointed out where, in Gillard, the step of calculating a motion vector for each pixel using the motion vectors for the adjacent blocks and the current block is shown, and furthermore, that these blocks have to be nearest to a specified current block.

A prior art reference anticipates the subject of a claim when the reference discloses every feature of the claimed invention, either explicitly or inherently. See Hazani v. Int'l Trade Comm'n, 126 F.3d 1473, 1477, 44 USPQ2d 1358, 1361 (Fed.
Cir. 1997) and RCA Corp. v. Applied Digital Data Sys., Inc., 730 F.2d 1440, 1444, 221 USPQ 385, 388 (Fed. Cir. 1984).

In the instant case, it may be possible to calculate the motion vector for each pixel using the block motion vectors, however, that is not shown by Gillard as required of an anticipation rejection under 35 U.S.C. § 102. Gillard states, column 7, lines 38-41, that "a choice is made of four from seven motion vectors, the seven motion vectors being the one

for that particular block and the six for the six nearest blocks respectively." The Examiner relies on this statement of Gillard and contends that "defining four motion block vectors as claimed are included in the seven motion vectors of Gillard." Examiner's Answer at page 10. We are not persuaded by the Examiner's reasoning. Gillard in columns 15 and 16 shows one way of selecting the four motion vectors. Gillard does not explain how the four motion vectors can be related to the individual pixel vectors, and neither does the Examiner. Therefore, the Examiner has not carried his burden of putting forth a prima facie case of meeting the recited limitation. Consequently, we do not sustain the anticipation rejection of claims 13 and 2 by Gillard.

Rejections under 35 U.S.C. § 103

The Examiner rejects claims 5, 6, 9 and 11 under this ground of rejection over Gillard in view of Keating and Takahashi at pages 6-9 of the Examiner's Answer.

As a general proposition, in an appeal involving a rejection under 35 U.S.C. § 103, an Examiner is under a burden to make out a prima facie case of obviousness. If that burden is met, the burden of going forward then shifts to the

applicant to overcome the prima facie case with argument and/or evidence. Obviousness, is then determined on the basis of the evidence as a whole and the relative persuasiveness of the arguments. See In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992); In re Hedges, 783 F.2d 1038, 1039, 228 USPQ 685, 686 (Fed. Cir. 1986); In re Piasecki, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984); and In re Rinehart, 531 F.2d 1048, 1052, 189 USPQ 143, 147 (CCPA 1976).

The Examiner uses Keating for motion compensated interpolations (answer at page 7), and Takahashi for motion vector selections in the subblock level (id. at 8). However, for the rationale above, we agree with the Appellants' position, brief at page 10, that, with respect to independent claim 9, the suggested combination of Gillard, Takahaski, and Keating does
not show the claimed limitation of "error estimation means, in particular linear error interpolation means, ... which comprise the motion vector of a current block and the motion vectors of three blocks adjacent to said current block and which calculate for each pixel in said current block estimated errors, ..."

With respect to the other independent claim, claim 11

we again are persuaded by the Appellants' argument that the combination of Gillard, Takahashi, and Keating does not show the claimed limitation of "subblock matching means for comparing sets of four of the stored block motion vectors, that is the motion vector of the current block and the motion vectors of the three adjacent blocks, to select vectors having a minimum sub block error," see brief at pages 9 and 10.

Therefore, we do not sustain the obviousness rejection of independent claims 9 and 11, and dependent claims 5 and 6, over Gillard, Keating and Takahashi.

In summary, we have not sustained the anticipation rejection of claims 2 and 13 by Gillard, and the obviousness rejection of claims 5, 6, 9 and 11 over Gillard, Keating and Takahashi.

The decision of the Examiner rejecting claims 2, 5, 6, 9, 11, and 13 is reversed.

Appeal No. 1999-2012
Application No. 08/801,610

REVERSED

KENNETH W. HAIRSTON Administrative Patent Judge	)	
LEE E. BARRETT Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
PARSHOTAM S. LALL Administrative Patent Judge	)	

PSL/jrg

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